Command Level
Maintenance & Material Management

The 3-M System's objective is to manage shipboard maintenance in a manner which will ensure maximum equipment and system operational readiness

Ship's 3-M Manual

3-M Assessment and Certification COMNAVSURFORINST 4790.1

- *ISIC conducts during basic phase of IDTC*
  - *ATG supports*
  - *Procedures in JFMM, Volume IV, Part I, Chapter 31*
- *Certification required for competitive awards*
- *Certification criteria*
  - *ACF & RAR 90% or better*
  - *MPR 80% or better*
  - *Department: at least 75% of work centers certified*
  - *Ship: no more than one major department non-certified*
- *Other requirements*
  - *Equipment site validations: one/week/WC/250 equipment files*
  - *Aggressive spot check program involving all from WCS to CO*

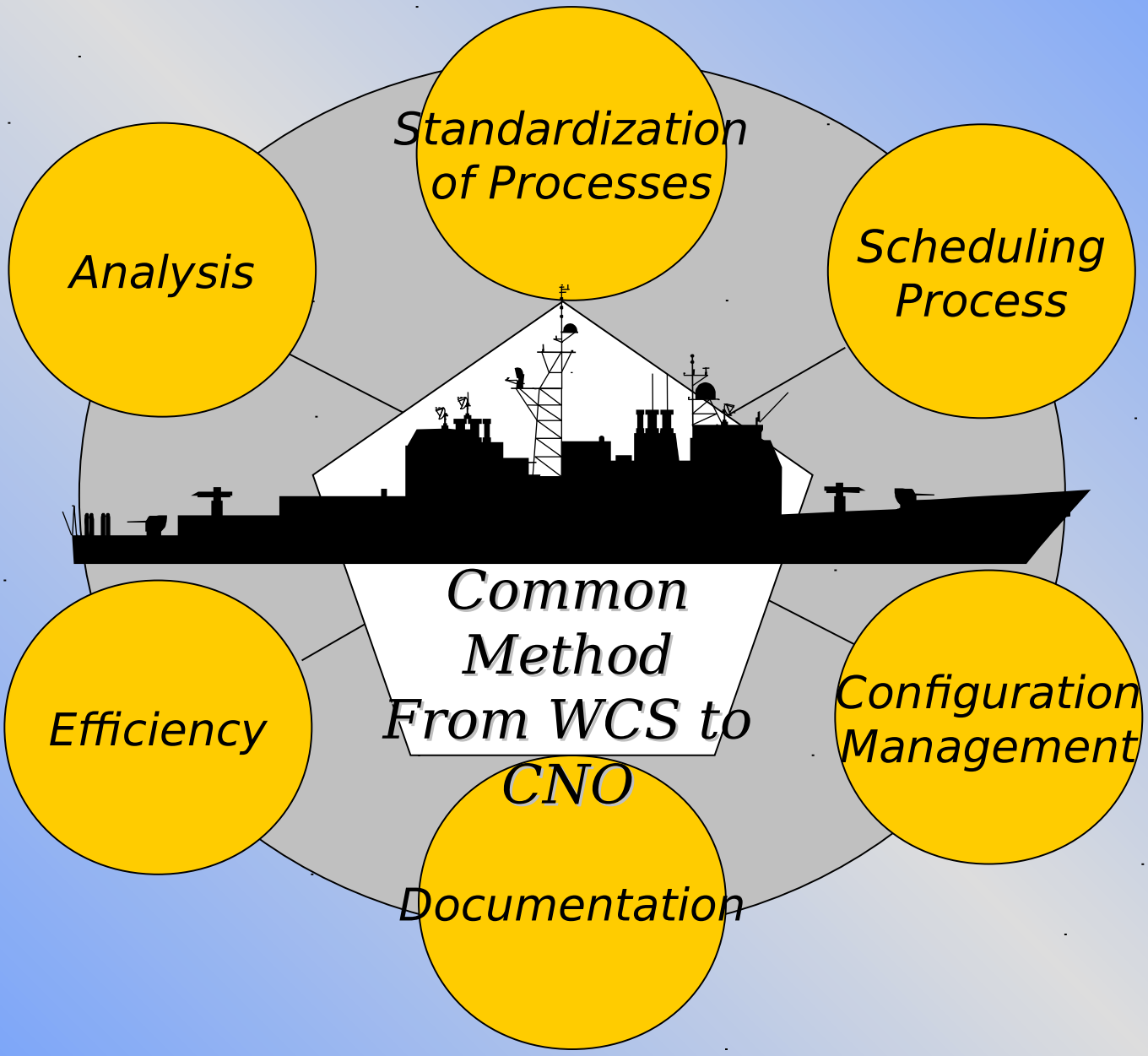
Related Issue
Tag-Out Program Discrepancies

- *Reference*
  - *COMNAVSAFECEN NORFOLK VA* 191630Z MAR04
- *Discrepancies*
  - *NAVSEA Tag-Out Users Manual not implemented*
    - *Revision 1 issued June 2003, effective 1 October 2003*
  - *Personnel have not completed 3-M Maintenance Person Personnel Qualification Standard*
  - *Lack of Maintenance Activity personnel participation in tag-outs*
    - *Ship's force does not require it*
    - *Maintenance Activity does not insist on it*
    - *Maintenance Activity personnel disregard Danger Tags*
  - *Ship's force audits overlook many obvious*

Related Issue
Repair Part Effectiveness

- *Reference*
  - *COMNAVSURFOR SAN DIEGO CA 261230Z AUG 02*
- *Repair part issue effectiveness*
  - *Affects Quality of Service*
  - *Net: measures issue rate from onboard allowances*
  - *Gross: measures issue rate based on all demands*
  - *Largest single driver: number of NIS requirements*
- *Message lists top twelve ways to improve effectiveness*

Ship 3M System Provides



Types of Maintenance

Preventive: tasks to retain functional capabilities

- *Prevent or discover functional failures*
- *Pre-planned*

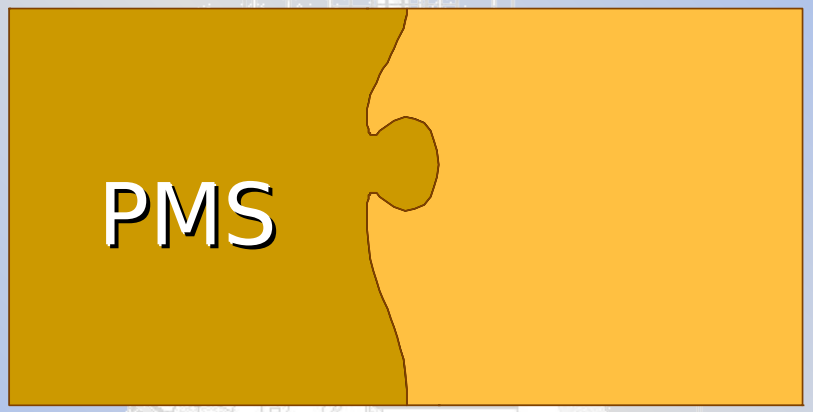
Corrective: tasks to restore functional capabilities

- *Fix equipment that has failed or is not working to design specifications*
- *<u>Unplanned</u>*
- *Includes authorized changes or modifications to installed equipment*

The 3-M System

- Primary management program for maintenance
  - CNO policy
- Two interlocking interdependent sub-systems:
  - The Planned Maintenance System (PMS)
  - The Maintenance Data System (MDS)

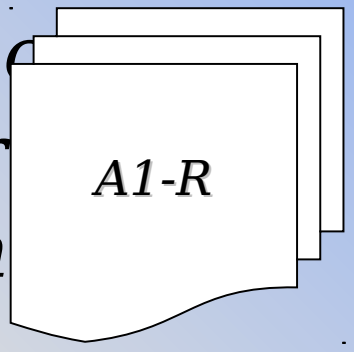
Planned Maintenance System



Planning, Scheduling and Accomplishing Preventive Maintenance

Planned Maintenance System

- *A Systematic Approach to Conducting Maintenance*
- *Includes*
  - *Planning and scheduling devic*
  - *Maintenance & test procedur*
  - *Integrated related maintenan*
- *A training aid*



Then and Now

- *Time-Directed maintenance was state-of-the-art*
- *Navy was averse to risk taking*
- *Navy had*
  pe

Then

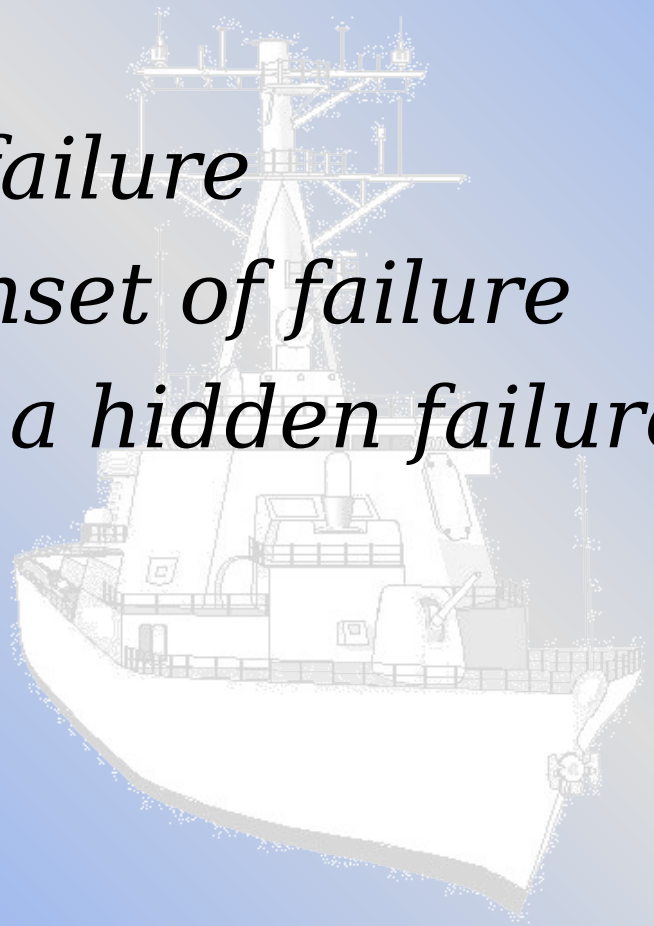
TIMES HAVE CHANGED

No w

- *RCM and CBM are now state-of-the-art*
- *Willing to accept risk management*
- *Budgets have been slashed by one-third*

Why Do Preventive Maintenance?

- *Prevent failure*
- *Detect onset of failure*
- *Discover a hidden failure*

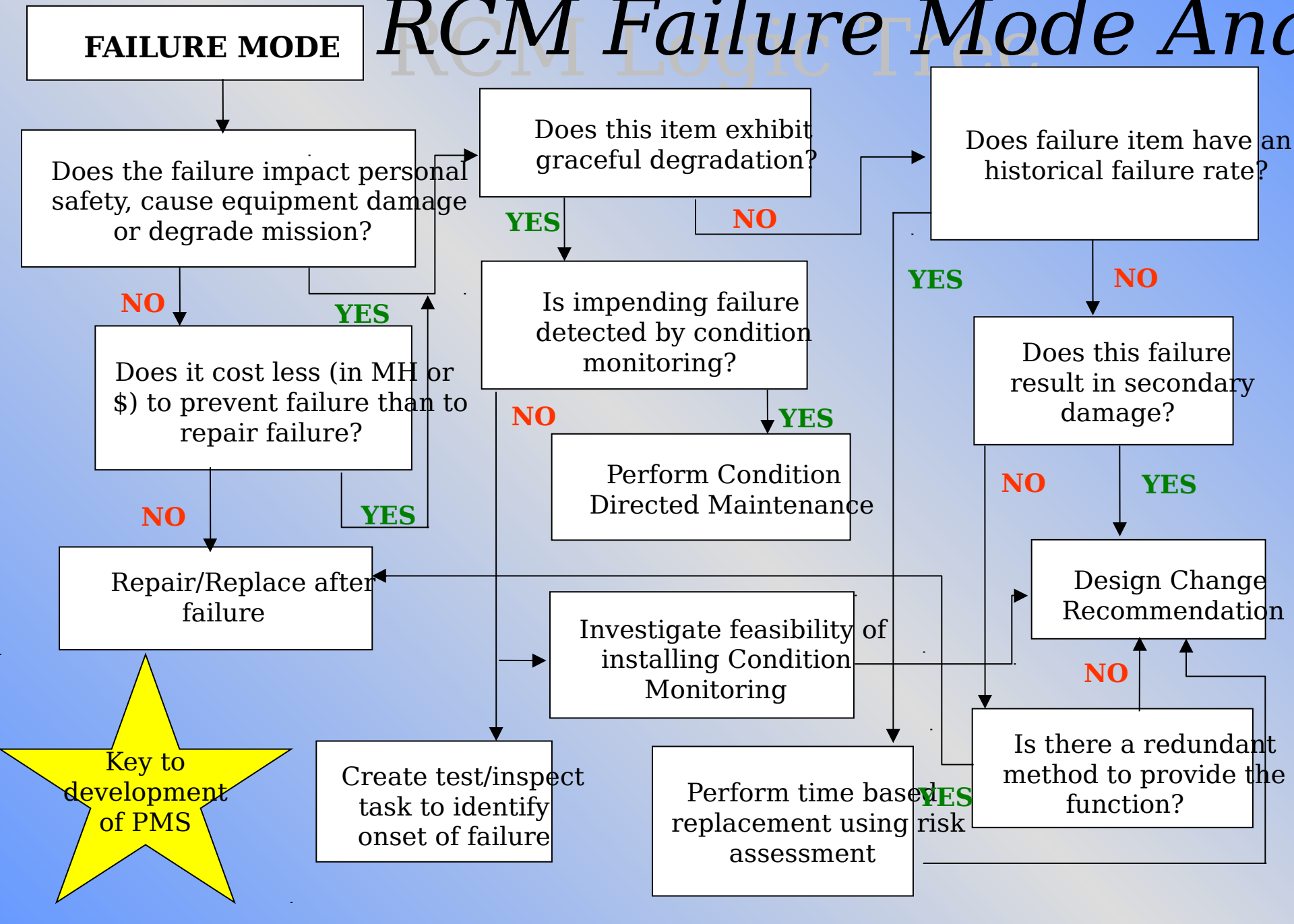


Ship Planned Maintenance System Goal

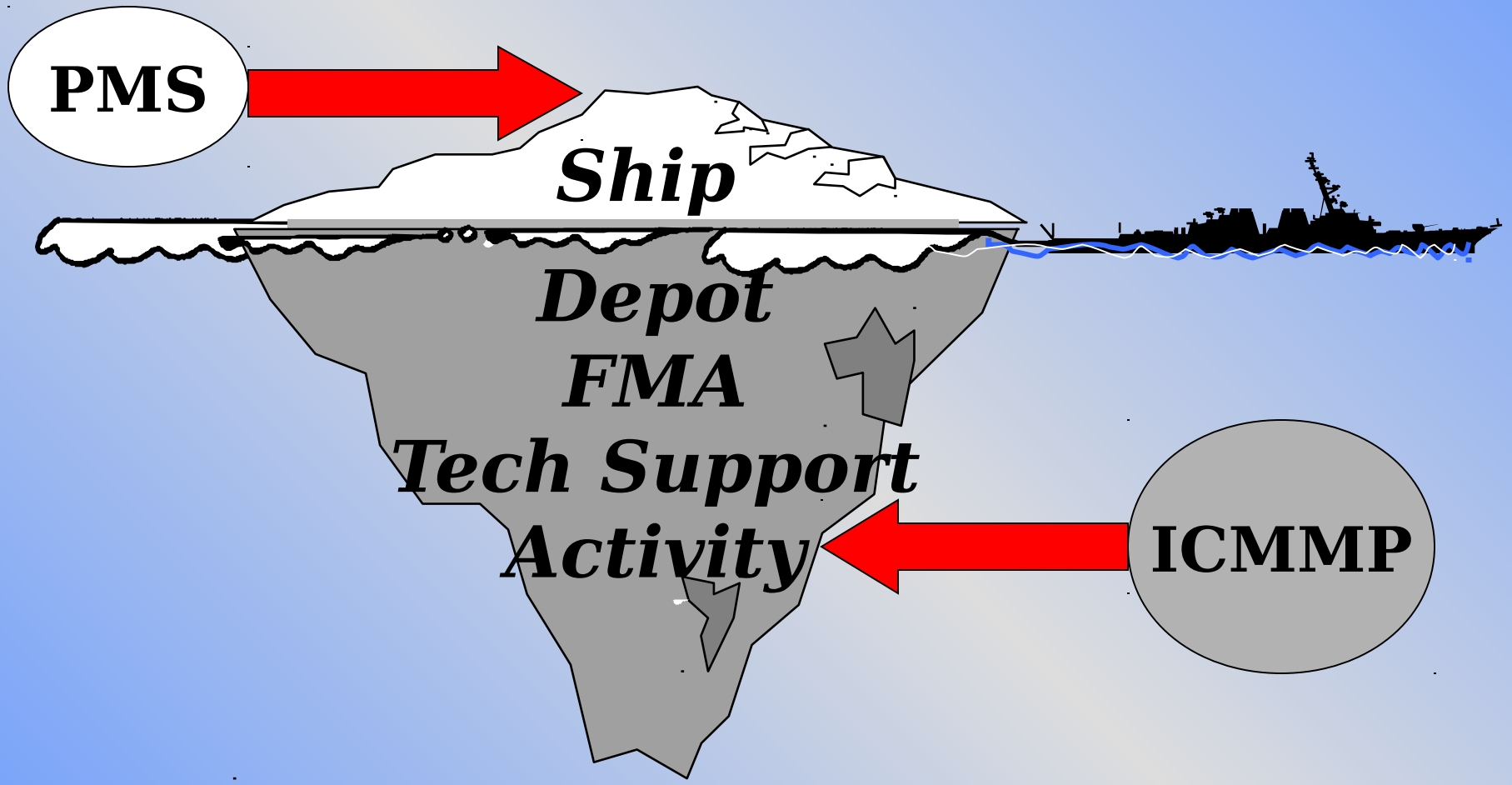
- *Planned maintenance actions should:*
  - *Meet the objective of reducing unplanned equipment repairs*
  - *Assist in identifying parts or equipment requiring replacement prior t*

Prevent, Mitigate, Detect onset of, or Find Failure

RCM Failure Mode Ana


FAILURE MODE
Does the failure impact personal safety, cause equipment damage or degrade mission?
NO
YES
Does it cost less (in MH or $) to prevent failure than to repair failure?
NO
YES
Repair/Replace after failure
Key to development of PMS
Does this item exhibit graceful degradation?
YES
NO
Is impending failure detected by condition monitoring?
NO
YES
Perform Condition Directed Maintenance
Investigate feasibility of installing Condition Monitoring
Create test/inspect task to identify onset of failure
Perform time based replacement using risk assessment
YES
Does failure item have an historical failure rate?
YES
NO
Does this failure result in secondary damage?
NO
YES
Design Change Recommendation
NO
Is there a redundant method to provide the function?

ventive Maintenance Continuum



Significant Changes coming

Maintenance Engineering

FROM KNOWLEDGE MU EFFECTIVENESS

We want our maintenance to be….
Reliability-Centered

No "KUMBYA" Insurance Maintenance Desired o

Which Means…
Preserving System Function

- *Identify failure modes that can defeat the functions*
- *Prioritize the failure modes*
- *Select only applicable and effective maintenance tasks*
- *Ensuring operator checks are in OSS*

Reduction of Surface Ship Maintenance Workload

Elimination of unnecessary PMS means

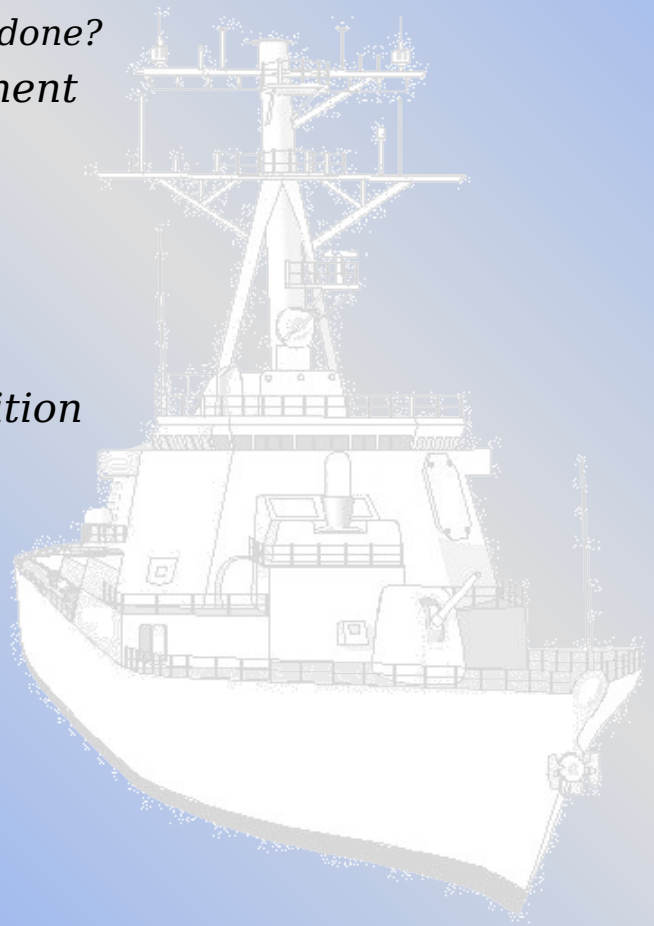
- *All remaining maintenance tasks must be accomplished*
- *Non-performance of necessary maintenance may result in*
  - *Increased safety risk*
  - *Lower equipment reliability*
  - *More corrective maintenance*

Surface Maintenance Effectiveness Review (SURFMER)

- Since inception
  - Over 90% of surface & carrier PMS man-hours reviewed
  - 43% reduction in PMS man-hours (2.8M annually)
- In 2002
  - Conducted six sessions
  - Eliminated 129,000 PMS man-hours
  - 374 tools & parts improvements
  - 198 positive HAZMAT changes
  - 646 procedure improvements
  - 175 In-Service Engineers & sailors trained & qualified in theoretical & applied RCM principles

PMS Management

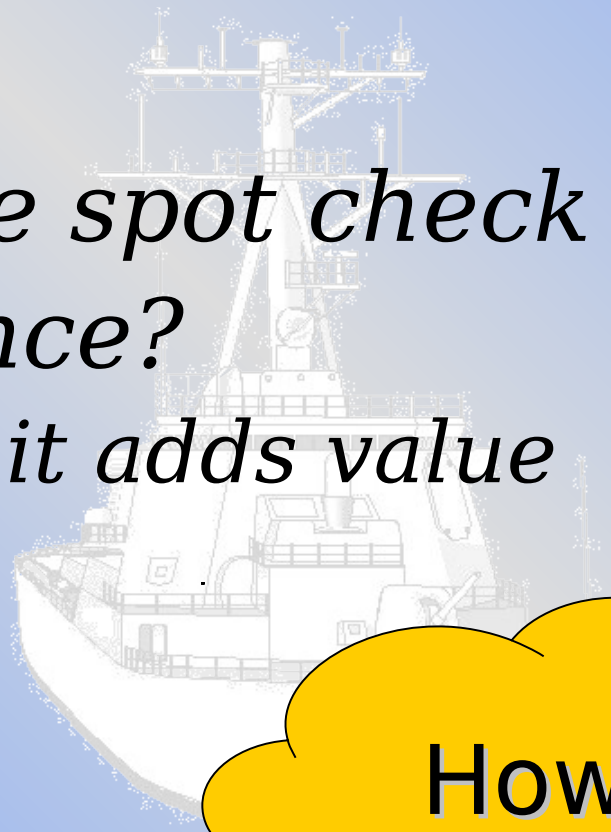
- *Reviewing assigned PMS*
  - *Is correct maintenance being done?*
- *Assessing PMS accomplishment*
  - *Is it being done correctly?*
  - *When, by whom?*
- *Training*
  - *On PMS administration*
  - *On maintenance procedures*
- *Documenting material condition*
  - *CSMP*
  - *3-M history*



Assessing PMS Accomplishment

Why do we spot check planned maintenance?

- *Because it adds value*



How do we add value?

Assessment Value

Improving The Ability To Self Assess

- *Assure correct performance*
- *Tag-out procedure effectiveness*
- *Improved documentation*
- *Calibration assurance*
- *One-on-one Training*
- *Skill level development*
- *Job performance evaluation*

Assessing PMS Accomplishment

WHEN DO YOU SPOT CHECK…

When the check is in progress?

or

When the check is completed?

Correct Answer: Possibly both! (Reference: CNSL PMS Note 01-02)

Assessing PMS Accomplishment Real Time

- *Saves man-hours*
- *First-hand knowledge of effectiveness*
- *Ability to assess:*
  - *Time to get tag out issued a cleared*
  - *Hazardous Material handling*
  - *Real-time equipment readiness*
- *Immediate Corrective Action*
  - *Administrative discrepancy*

Feedback
Per CNSL
PMS Note 02-02

PMS
As A Training Tool

- *New personnel*
  - *Maintenance*
  - *Operations*
- *Maintenance Procedures*
  - *Do you assign new personnel under instruction with qualified personnel?*

Damage Control PMS

- *Recurring issue on INSURV material inspections*
- *Separate work center*
  - *COMNAVSURFOR strongly recommends it*
  - *Decision rests with CO*

COMNAVSURFOR 311350Z JAN 02

DCPO Indoctrination: STEP Course A-495-0400

COMNAVSURFLANT 3-M Notes

- CNSL Maintenance Web Site
  - Guiding Directives/CNSL Directives/CNSL 3-M Notes
- PMS Notes
  - 01-96 – OMMS CASREP Requirements
  - 01-97 – ASI Tape Processing/Employing AutoVBI Procedures
  - 03-97 – Elimination of Requirement to Update 4790/2K Blocks 38-40, First and Second Contact Man
  - 01-01 – New PMS Quarter Start Date
  - 01-02 – PMS Spot Checks, Location Guide Lists, DC Equipment PMS
  - 02-02 – PMS Feedback Report Submission Procedures

Command Level

Next Topic

Maintenance & Material Management